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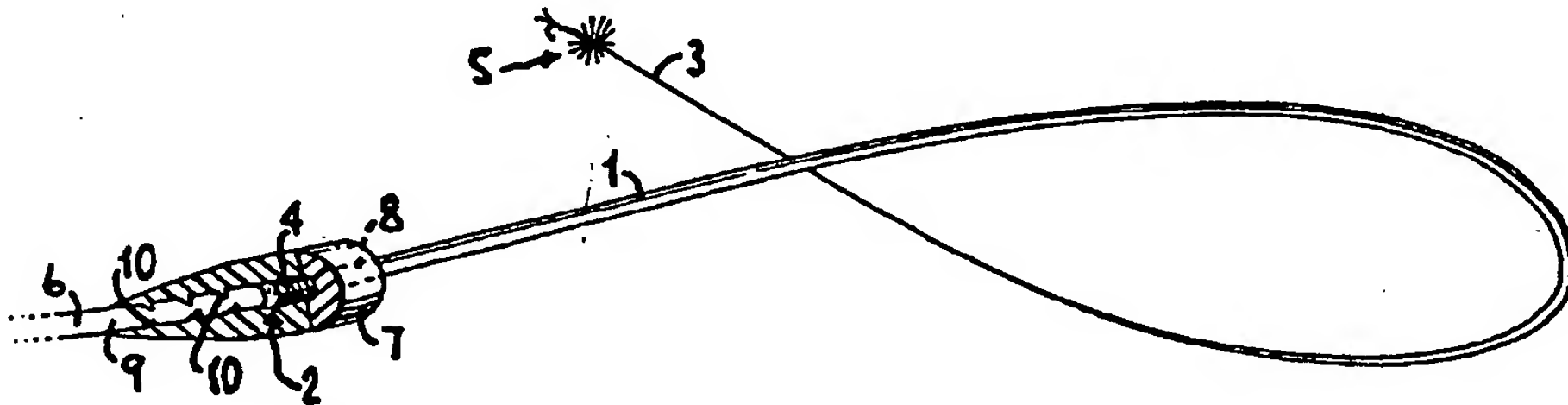
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(57) Abstract

A leader or line (1, 6) used for fishing, preferably a monofilament line, has a threaded portion (15, 16) on one end for attachment to a threaded connector (7) attached to a separate line or to a terminal fixture or intermediate fixture in a modular manner. The threaded portion (15, 16) can be integral to the line(s) or fixture(s). The fixtures can include straight, branching and/or tapered leaders (1), snelled hooks (17), floats (18, 19), sinkers or lures (21) and the like. The threaded connections (15, 16) provide a quick and easy attachment for a monofilament tapered or non tapered leader to a fly line without the complexity and discontinuity of a knot. The initial threaded connection to the connector (7) can be made on a conventional line passed through a through-hole and knotted. The knot is enclosed in the connector (7) providing a threaded end for connection of one or more successive leaders or fixtures.

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FISHING LEADER WITH THREADED CONNECTIONS

BACKGROUND OF THE INVENTION

This invention relates to a fishing leaders, lines and apparatus used for sport fishing, such as in the sport of fly fishing or spin fishing. More particularly, the invention provides integral threaded connections for fishing lines, leaders, connectors, floats, weights and similar apparatus, that facilitate connections without using knots and that enable a fishing line to be configured with a minimum of discontinuities.

In the sport of fly fishing, the angler uses a long, flexible fly rod made of bamboo, fiberglass or graphite, a fly reel to hold a floating or non-floating fly line that is attached to a tapered or non-tapered leader to which an artificial fly or insect replica is attached.

In the sport of spin fishing, the angler uses a shorter but flexible rod made of bamboo, fiberglass or graphite, an open face or closed face spinning reel to hold a monofilament or braided spinning line that is attached to an artificial lure or to live bait.

Both the fly fishing angler and the spin fishing angler have the need to join lines and leaders of similar and dissimilar materials and diameters together in order to present the fly or the lure in a manner that will attract fish. This is usually done by the angler tying the lines together with one of several knots that have been developed over the years by anglers. Many of the knots that are reliable and satisfactory for this purpose are difficult to tie in the field or are difficult to tie if the angler has poor eyesight or poor finger dexterity. In addition, these knots are usually difficult to untie and usually require the angler to cut the line in order to attach a different leader or lure.

In the sport of fly fishing, the angler usually attaches a tapered, thin monofilament or braided leader line to the end of a relatively heavy braided and coated fly line and then attaches thinner monofilament lines, called tippets, to attach the fly to the end of the leader. Both the leader line and the tippets need frequent replacement in the field as a result of breakage or change in fishing conditions.

The attachment of a thin tapered or non tapered leader line to the heavier braided and coated fly line has always been a problem since the connection between the fly line and the leader must be smooth to reduce wind resistance and to pass freely through the guides and ferrules of the fly rod. In the past this connection has been accomplished with special knots,

special splices, end loops, adhesives and special mechanical connectors. One such connector disclosed in U.S. Patent No. 4,604,821 issued in 1986 to Moser is a tube of braided fibers which fits on the end of the fly line and the end of the leader and operates like a so-called Chinese finger trap that when elongated under tension, shortens radially to grip the ends of two abutted lines.

As indicated above, all anglers, and especially fly fisherman have the need to make simple and frequent changes of leaders in the field to accommodate breakages and changes in the fishing conditions. It is quite common to need to change from a long leader to a shorter leader because of a sudden change in wind conditions or in the character of the stream or the type of fly or lure being fished. It is also common for an angler to change from a "sinking" type of leader to a "floating" type of leader to adapt to sudden changes in the fishing environment.

Likewise in connection with other forms of reel and spinner fishing, it is frequently desirable to change the way the line and bait are configured. For example, an angler having limited success with one configuration or who moves from one fishing location to another or who desires to attempt to catch a different kind of fish, may wish to change all or part of the apparatus on the line, or to adjust the line to reposition the respective devices. For example, the angler may wish to change from a lure to a fresh bait or vice versa, to add or reduce the weight on the line, to adjust the line configuration for a different depth at which a bait is suspended, to change from a suspended weighted bait to a free running or bottom resting bait, and so forth.

Such changes normally require the angler to remove the existing configuration and install a different one. Spring clips and the like are available to be clipped or tied between two lines or between a line and a hook, lure, float or the like, but at least one knot is typically required (at least to attach one end of a line to an eye or the like). The usual configuration requires at least one knot that is spaced from the bait by a not-insubstantial distance, particularly in connection with leader. If the angler needs to cast, at least one more proximal knot often may be reeled inwardly beyond one or more guides or ferrules on the rod, the knot defining a potential obstruction in casting. Knots also are frequently the location along the line at which weeds or other obstructions become snagged.

Knots are difficult to execute, particularly in monofilament line, because traditional knots (e.g., a square knot for equal sized lines, or a sheet bend for different sized lines) do not readily remain tied in monofilament. Effective monofilament knots generally require a plurality of repeated loops, e.g., resembling a timber hitch, which are drawn tight into the knot. Such knots can also be difficult to execute under fishing conditions, for example when rolling and pitching in a boat or when the angler's hands are wet and slippery. It would be advantageous if connections of this type could be more easily executed. It would also be advantageous if the connections could be made without introducing a substantial discontinuity into the line, so that the line is less apt to catch on the guides or ferrules of the rod, and less likely to snag weeds or obstructions in use.

SUMMARY OF THE INVENTION

It is an object of this invention to provide an improved and versatile means for connecting fishing line to and between various devices used in fishing, facilitating ease of coupling of the devices and minimizing associated discontinuities.

It is also an object to provide a fishing line or leader that is easily attached at a butt joint to a separate fishing line, especially one of a different diameter.

It is another object of this invention to provide a new and improved monofilament fishing line, especially suitable for use as a leader or connector for the sport of fly and spin fishing, that does not require the angler to tie special knots.

It is still another object of this invention to provide a new and improved fishing line or leader and connector that can be easily attached or detached, to couple and decouple lines and/or objects under field conditions.

It is a further object of this invention to provide a new and improved fishing line or leader and connector that can be easily manufactured and used to make connections with existing fishing tackle and lures, as well as tackle and lures having complementary connectors for receiving the line or connector.

The foregoing objects are achieved according to the invention using a monofilament line having that is threaded integrally on at least one end thereof which allows the threaded end to be easily and quickly threaded into a matching threaded female end or a fitting or connector attached to the end of another line, or to an other apparatus placed along the line, such as a float

or strike indicator, a branching leader or a connector for providing a receptacle for enclosing a knot in a length of conventional line.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is an isometric view of a one embodiment of the monofilament tapered leader according to the invention.

FIGURE 2 is an isometric view, partly in section, of the monofilament tapered leader attached to a fly and to the end of a fly line using a preferred embodiment of a suitable connector.

FIGURE 3 is an isometric view of a second embodiment of a monofilament tapered leader of the invention.

FIGURE 4 is an isometric view of a third embodiment of a monofilament tapered leader.

FIGURE 5 is an elevation view, partly broken away, showing a snell leader connector according to the invention.

FIGURE 6 is an elevation view showing a snell leader including an integral strike indicator or float.

FIGURE 7 is an elevation view of a section of leader including an integral strike indicator or float.

FIGURE 8 is an elevation view, partly in section, showing a float according to the invention, insertable between line and connector segments as in the previous embodiment.

FIGURE 9 is an elevation view, partly in section, showing a first adapter for interfacing between the integral threaded connection of the invention and an eye, snap hook, lure or the like.

FIGURE 10 is an elevation view, partly in section and partly broken away, showing a branching leader or dropping leader according to the invention.

FIGURE 11 is an elevation view showing the invention applied to a shock absorbing leader.

FIGURE 12 is an elevation view showing the invention applied to a sinking leader.

FIGURES 13a-13d are corresponding views showing variations of the connector and leader combination of the invention.

FIGURE 14 is an exploded elevation view, partly in section, showing a threaded connection between a tapered leader and a line.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGURE 1 is an isometric view of one embodiment of a monofilament tapered leader or line of this invention. As shown in FIGURE 1, leader 1 is comprised of a single strand of a flexible polymer, such as nylon, having a butt end 2 of a diameter larger than the tip end 3. The butt end 2 has a short integral threaded portion 4. Typical leaders 1, as illustrated in FIGURE 1, used for fresh water fly fishing, will be of a length of about 7 to 9 feet (2.1-2.7m) in length and will have a butt end 2 diameter of about 0.019 to 0.09 inches (0.50-2.3mm) and gradually taper to a tip end diameter of about 0.005 to 0.015 inches (0.13-0.4mm). Typical leaders 1 used for salt water fly fishing may be somewhat larger in diameter than those used for fresh water fly fishing.

The short integral threaded portion 4 is formed by either machining with a die or rolling a standard coarse or fine thread into the butt end 2 of the monofilament polymer leader or line. The thread should be long enough to provide a good connection but also allow the butt end 2 to be attached or detached from the fly line without tools, using only the fingers of the angler.

FIGURE 2 is an isometric view, partly in section of a monofilament tapered leader 1 of this invention attached to a fly 5 and to end of a braided and coated fly line 6 using a preferred embodiment of a suitable connector 7. As shown in FIGURE 2, the threaded portion 4 of the butt end 2 of the leader 1 is threaded into a mating threaded female socket 8 formed in one end of the connector 7. The end of the braided and coated fly line 6 fits into a socket 9 in the other end of the connector 7 which is provided with teeth or barbs 10 which are clamped tightly around the periphery of the end of the braided and coated fly line 6. The teeth or barbs 10 may be similar to those disclosed in my prior U.S. Patent No. 4,864,767 issued September 12, 1989 for "Fishing Line Jaw-Type Connector."

The connector 7 is made of metal or plastic and, as shown in FIGURE 2, is of a diameter only slightly larger than that of the fly line 6. As shown in FIGURE 2, the connector 7 will allow the threaded portion 4 of the butt end of the leader 1 to be quickly and easily attached or detached by the angler from the end of the fly line 6. While I have illustrated a preferred embodiment of a connector 7 (enlarged for clarity), other shapes and styles of

connectors could be used so long as they have a female threaded socket to receive the threaded butt end portion 4 of the leader line 1 to be attached.

FIGURE 3 is an isometric view of a second embodiment of a monofilament leader 1 of this invention. In this embodiment, the threaded portion 4 is a separate sleeve 11 of nylon or other suitable polymer or a metal having external threads 12 and a central bore 13 to receive a smooth or irregular butt end 2 of the leader 1. The sleeve 11 is then permanently attached to the butt end 2 of the leader with a suitable adhesive or glue or by a heat bonding technique, well known in the art.

FIGURE 4 is an isometric view of a third embodiment of a monofilament leader 1 of this invention in which a portion of the leader between the butt end 2 and the tip end 3 is provided with a weighted portion 14 which will cause the leader to sink in the water.

While I have illustrated, as preferred embodiments, a monofilament polymer material for the leader line 2, this invention could also be easily adapted to braided leader lines or to metal leader lines that are used by anglers for special fishing conditions. Moreover, the invention is advantageously used in combination with complementary connections made to selectable modular elements by means of male threads 15 and female threads 16. As shown in FIGURES 5-14, such modular elements can include, instead of or in addition to a simple leader, a snelled line 17, a bobber 18 that is integral with a leader or a separate bobber 19 or a intermediated bobber 20, a sinker, adapter or lure 21 in turn coupled to a fixture 22 such as an eye, hook or spring clip, one or more branching leaders 23, a shock absorbing device or leader section 24, or a weighted leader section 25, or a gender switching leader or device. Each of these modular elements has complementary male and/or female threads 15, 16, whereby the user can readily configure a fishing line to various circumstances, and without requiring any knot save for the attachment of the initial connector 7.

In FIGURE 5 shows application of the invention to a snelled hook or leader 17, i.e., to a section of leader having a male threaded connector 15 according to the invention, which integrally tapers into the leader 1, and at the distal end is attached by a conventional knot to a wire fish hook. The leader can be of a conventional length, e.g., about 4.5 inches (11.5cm). Alternatively, the leader can be longer, because unlike knotted connections along the line, the leader and connector of the invention present only a minimal discontinuity due to the taper leading toward the distal or hook end, and can readily pass through the guides or ferrules along

the fishing rod (not shown). In the embodiment shown, the snell leader 17 has a male thread, but it will be appreciated that the gender of the connections according to the invention can be in either order.

In FIGURE 6, a snell leader includes a strike indicator or float 18, which is integral with the threaded connection end fitting. The float can be injection molded integrally with the connector and line 1, for example having a hollow interior in a parison molded technique, or incorporating a low density plastic foam, a body or cork or the like (not shown). As shown in FIGURE 7, a strike indicator 19 can also be formed integrally along the line 1 and formed of a more elongated shape such that a downward pull on the end of the line causes the floating strike indicator to turn on end. In this embodiment, the strike indicator or float 19 is disposed between a thicker section of leader coupled to the connector, e.g., a four foot (1.3m) section of 0.024 inch diameter nylon, and a thinner section of leader coupled to the distal end of the line and to the hook or other bait, e.g., a five foot (1.7m) section of 0.015 inch (0.4mm) diameter. It will be appreciated that the strike indicator and the integrally coupled leader sections can be varied in size and shape, as well as color, etc.

FIGURE 8 shows an alternative embodiment wherein a flotation adjustment body 20 such as a float or sinker has opposite male and female connections is insertable between a line and a connector such that an integral threaded connection for a line as described above can be made. The connection along the line is simply separated and the respective ends are attached threadably to opposite sides of the float or sinker 20. FIGURE 9 shows that the integrally threaded line can form the attachment for a device associated with a lure, sinker or bobber having an eye, hook, spring clip or other form 21, as a means for interfacing the integrally threaded line to such a device 22.

In FIGURE 10, the invention is applied to forming a branching leader 23, for example as used to drop several hooks or lures from the line. One or a plurality of branching or dropping leaders can be attached to one another serially to provide a number of spaced hooks, e.g., for placing lures or bait at different depths or at horizontally spaced positions. Each connection is conveniently made with the integrally threaded lines and connections 15, 16 as described above. The branching leader can have the dropping or branching part associated with the male or female end, or the branch can be from an intermediate point. The dropper leader can have an inter-connector length of two to five feet (30cm to 1.5m). The dropping portion

can be tapered along its length, e.g. from 0.024 to 0.006 inches (0.6-0.15mm) over a length of five feet (1.5m). Other dimensions are also possible. Preferably the device is injection molded integral nylon.

In FIGURES 11 and 12, a leader according to the invention is coupled to a length of discrete material rather than being integral, for varying the shock absorbing, weight or flotation characteristics at a limited length of leader having an integral threaded connector. In FIGURE 11, the leader extends part way into a length of a section 24 of extensible material such as a braided length of fiber, which provides a shock absorbing action. The extensible section can be attached to the leader and to a further leader by heat welding, adhesive or by a whipped end or knot as shown. As shown in FIGURE 12, the extension section can be combined with a weighted section 25 in the same manner, these sections being telescoped onto one another and attached at the ends by adhesive, welding, whipping or similar arrangements.

It will be appreciated that the integral threaded couplings of the invention provide a modular series of elements for elongating a line, for attaching fixtures such as branches, flotation (or sinking) means, variations in the thickness or other character of the line, etc. The cut-off or terminating extension as shown in leader 1 in FIGURE 13a can be replaced by a leader with two connectors, thereby providing either an extension that adds length between different gender threads as in FIGURE 13b, or switches genders between connectors 15 and 16. The double-male extension as shown in FIGURE 13c, for example, switches genders by attaching a male connector to a female connector (not shown), leading in turn to a male connector. Likewise, two female connectors can be provided at opposite ends connected by any length of line, or as shown in FIGURE 13d, an additional useful item is a gender switcher *per se*, even without a length of interposed line.

FIGURE 14 shows a further embodiment similar to that of FIGURES 1-4, wherein a tapered line sheath having a male thread with an internal opening leading to a cavity, is attachable to a female threaded connector having a through hole leading to a cavity. These connectors can be threaded over cylindrical line that is knotted or provided with an end plug of relatively larger diameter, for providing a threaded connector according to the invention on an otherwise conventional line. These arrangements are useful for applying the invention to conventional line. Having provided a male or female threaded connector as shown in FIGURE 14, the extensions, branches, fixtures and other particulars as explained above can be inserted

as appropriate, providing a modular series of useful fishing means that are all readily connectable using the integral threaded connectors as shown.

Some of the foregoing preferred embodiments are most suitable for fly fishing. Others are adapted for use with open or closed face spinning tackle or with other casting reels. In any event, each of the embodiments provides a versatile and convenient means to enable an angler to quickly and easily reconfigure his or her angling arrangements in the field, without the complexity and discontinuities involved with knots.

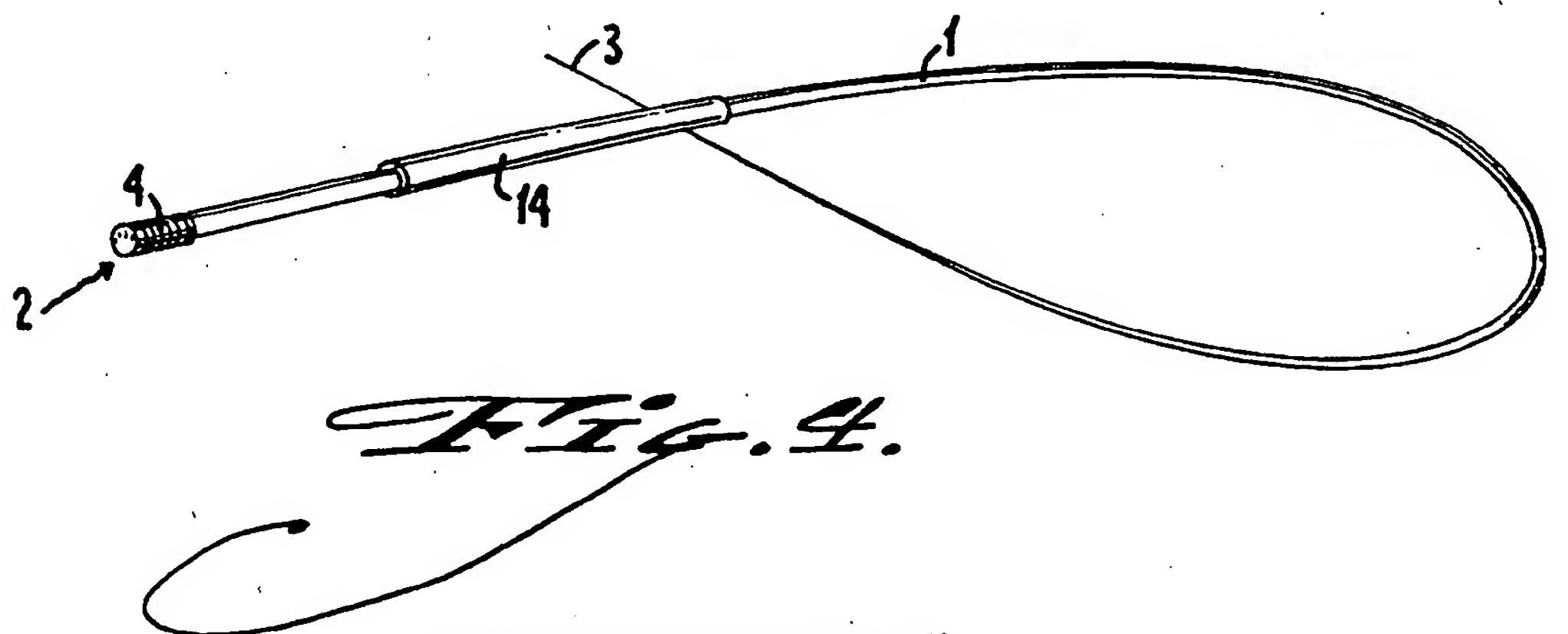
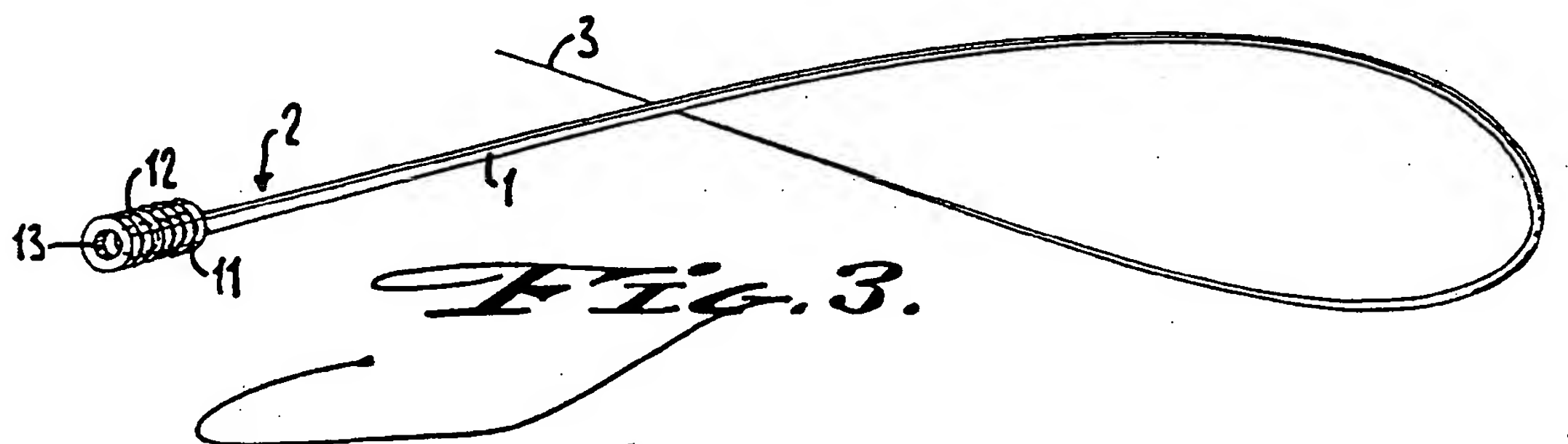
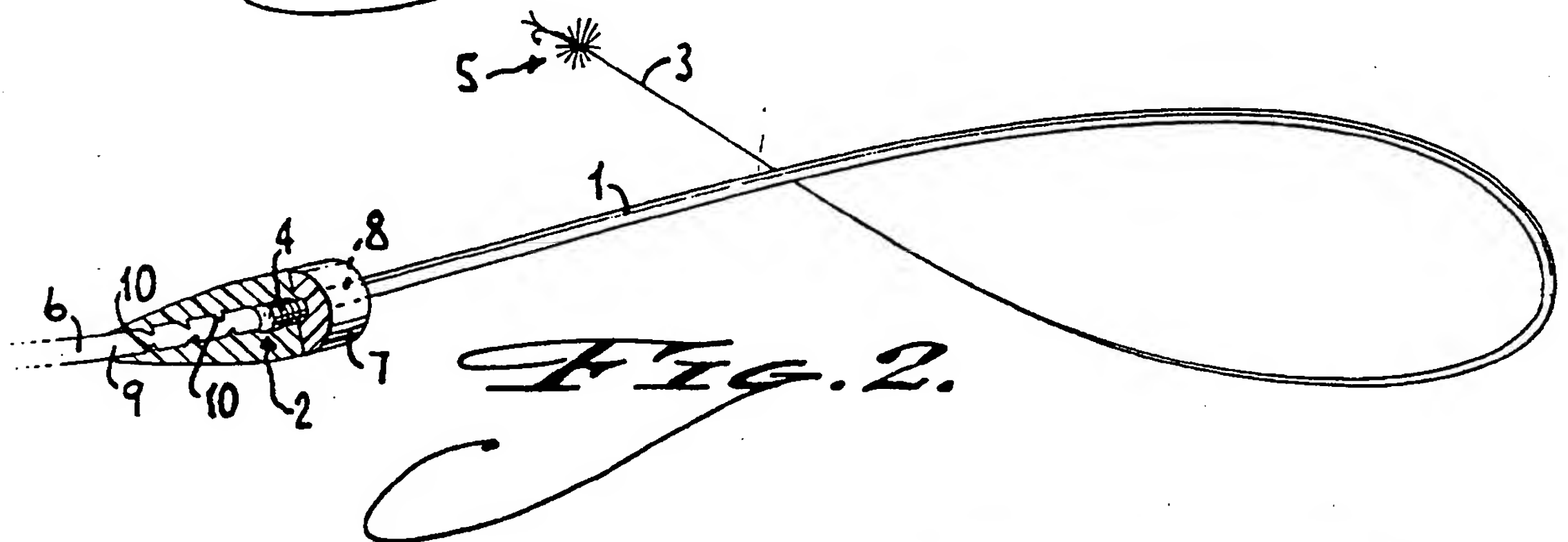
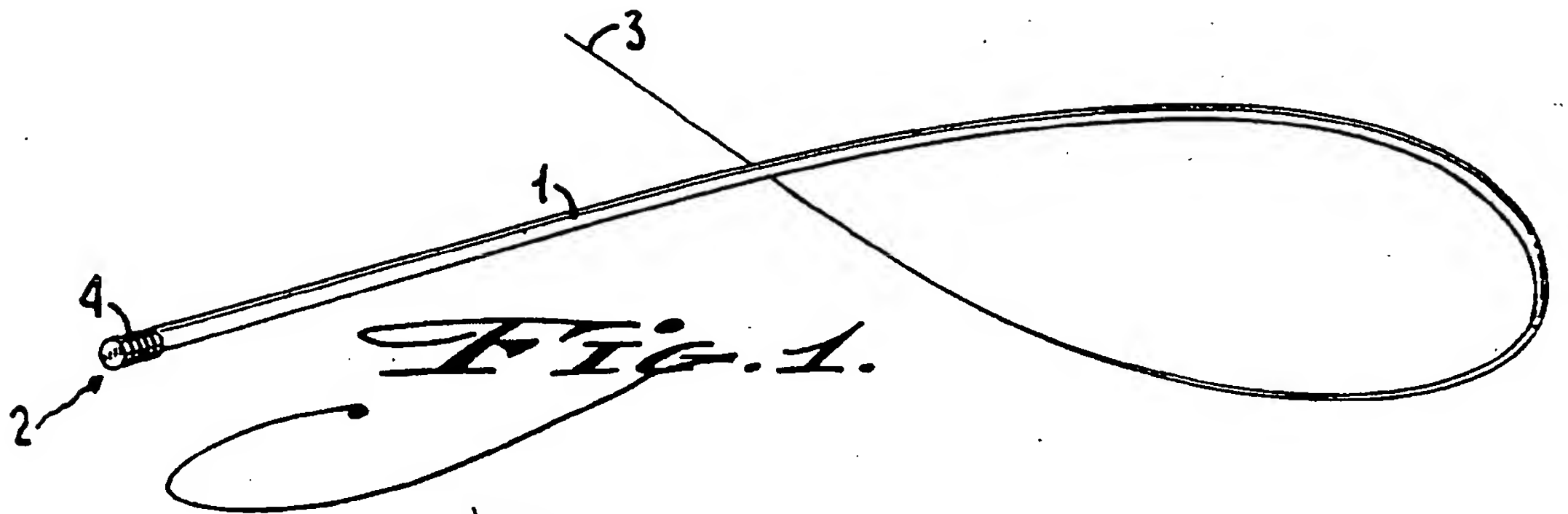
The foregoing exemplary embodiments of the invention represent a number of variations illustrating the invention as presently preferred. Whereas these embodiments are intended as representative rather than limiting, reference should be made to the appended claims rather than the foregoing description in order to ascertain the scope of the invention in which exclusive rights are claimed.

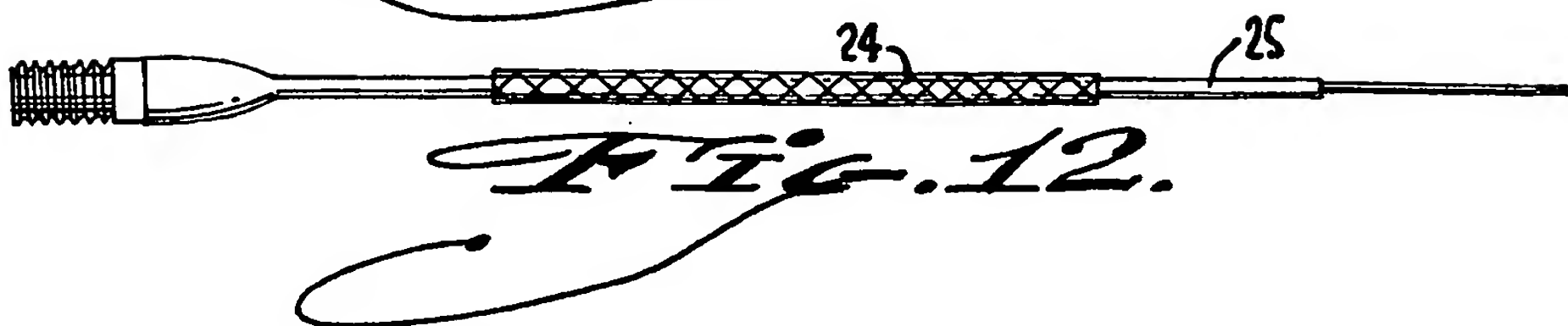
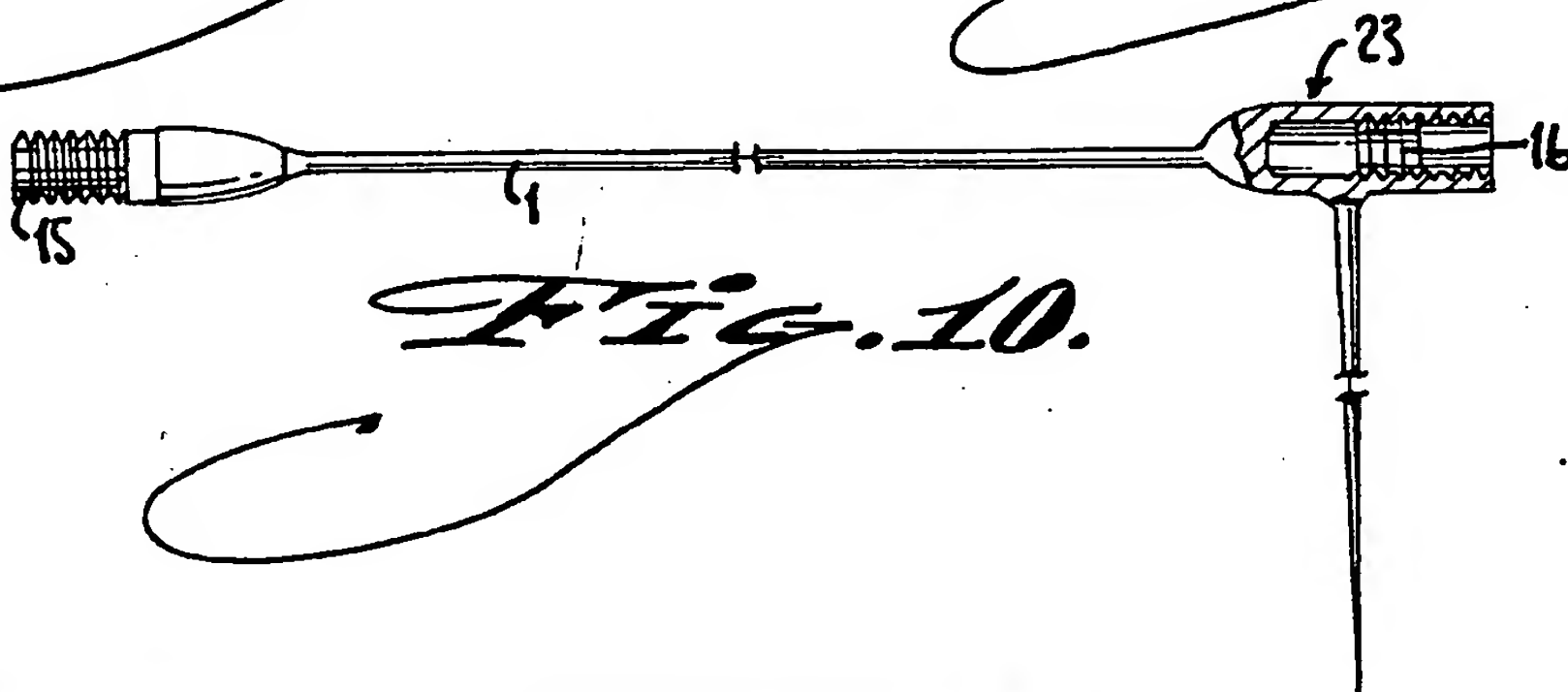
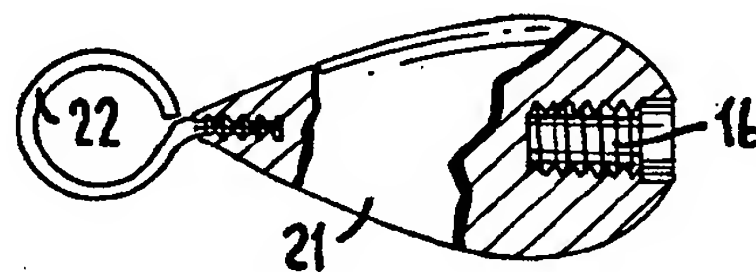
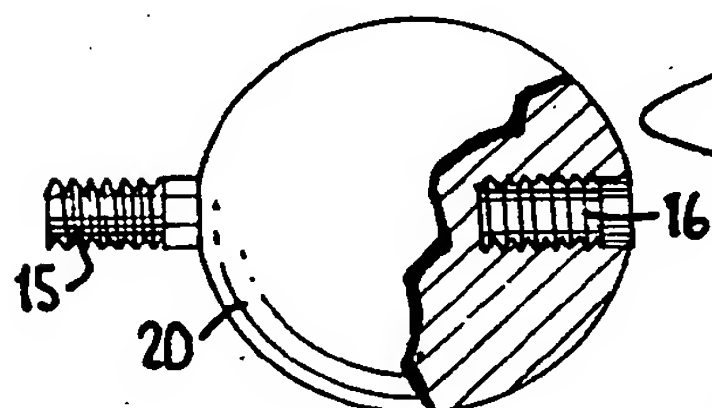
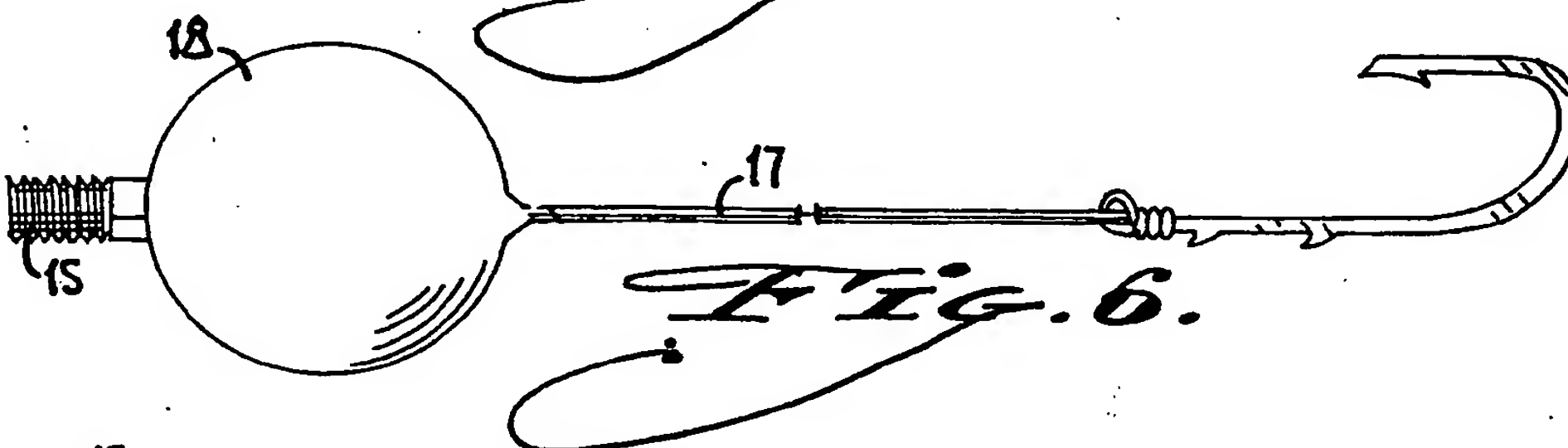
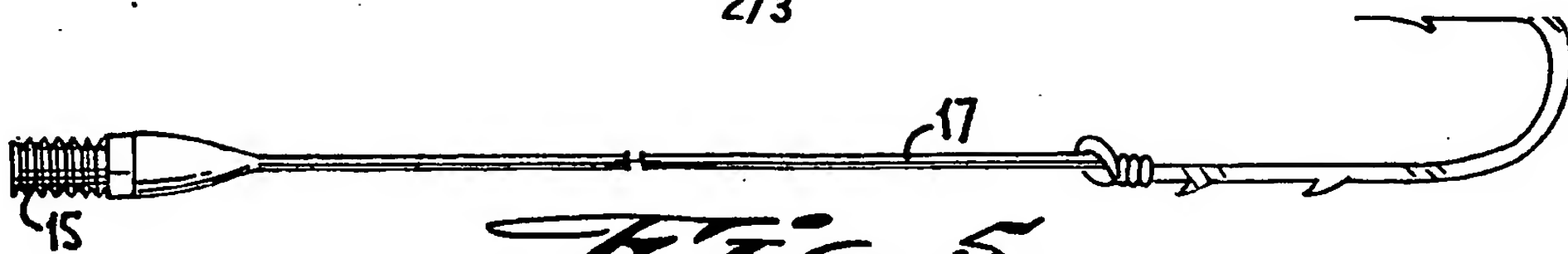
CLAIMS

1. The combination of a fishing line (6), a leader line (1) and a connector (7), the connector (7) having means (9, 10, 22) formed in one end for attachment of an end of the fishing line (6), and a female threaded socket (8) formed in the other end for receiving a thread (15, 16) formed integrally on at least one end of the leader line (1).
2. The combination of claim 1 in which the leader line (1) is tapered and the thread (15 or 16) is formed on a butt end (2).
3. The combination of claim 1 in which the leader line (1) is a monofilament line.
4. The combination of claim 1 in which the leader line (1) is made of a polymer.
5. The combination of claim 1 in which the means (9, 10, 22) formed in said one end of the connector (7) for attachment of the end of the fishing line (6) comprises a female socket (9) having barbs (10) which clamp around a periphery of the fishing line (6).
6. The combination of claim 1 in which the leader line (1) is attached by means of at least one pair of complementary threaded connectors (15, 16) to at least one of a hooked snell line (17), a floating means (18, 19, 20), a sinking means (21, 25), a lure (22), a branch (23) and a shock absorbing means (24).
7. A modular fishing apparatus, comprising in combination:
a fishing line (6);
a terminal device (1, 17-25); and,
a connector (7), the connector (7) having means (9, 10, 22) formed in one end for attachment of an end of the fishing line (6), and a threaded socket (15, 16) formed in the other end for receiving a thread (16, 15) formed integrally on the terminal device (1, 17-25).

8. The combination of claim 7, in which the terminal device comprises at least one of a leader (1), a hooked snell line (17), a floating means (18, 19, 20), a sinking means (21, 25), a lure (22), a branch (23) and a shock absorbing means (24).

9. The combination of claim 8, in which the terminal device comprises a plurality of modular elements connectable by said threads (15, 16), including at least two of said leader (1), hooked snell line (17), floating means (18, 19, 20), sinking means (21, 25), lure (22), branch (23) and shock absorbing means (24).





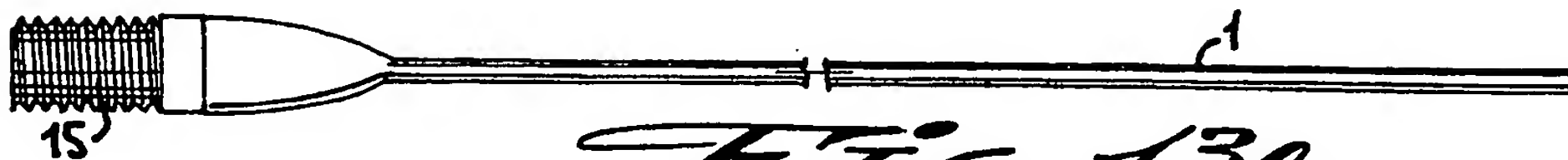


Fig. 13a.



Fig. 13b.

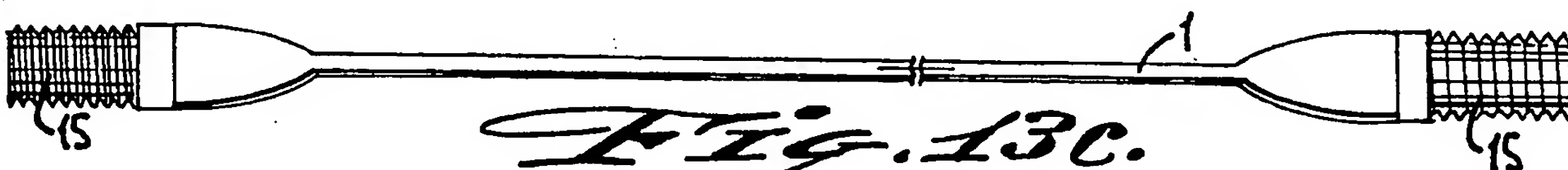


Fig. 13c.

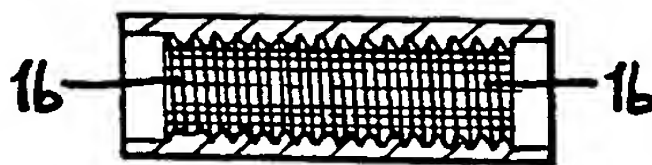


Fig. 13d.

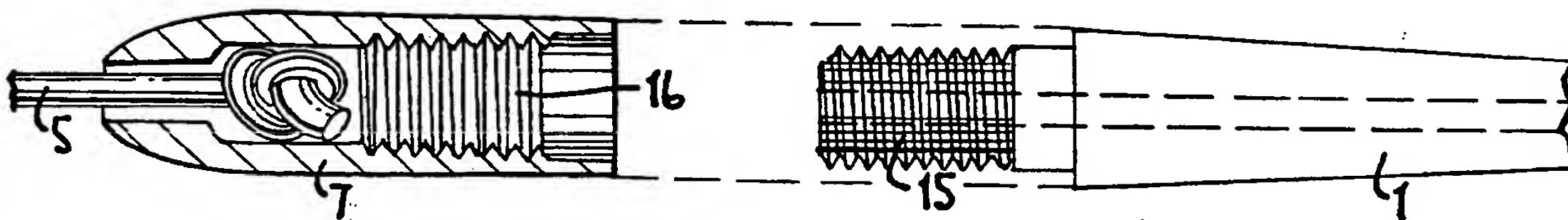


Fig. 14.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/09917

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :A01K 91/04

US CL :43/44.83

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 43/44.83, 44.98; 59/95; 403/182, 184, 287, 296, 343

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 4,117,574 (YOSHIDA) 03 OCTOBER 1978	1-9
A	US, A, 3,041,695 (OUELLETTE) 03 JULY 1962	1-9
A	US, A, 1,756,973 (CONNER) 06 MAY 1930	1-9
A	US, A, 1,732,581 (JOHNSON) 22 OCTOBER 1929	1-9
A	US, A, 999,914 (TOLMAN) 08 AUGUST 1911	1-9
A	US, A, 147,928 (FRY) 24 FEBUARY 1874	1-9



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